HP ProLiant ML530 Generation 2 Server Memory Installation Guide

February 2003 (Second Edition)
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About This Guide

This guide provides step-by-step installation instructions and reference information for operation, troubleshooting, and future upgrades for the memory system in HP ProLiant ML530 Generation 2 servers.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:

WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling jacks are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together in multiple-rack installations.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- The white paper on Advanced Memory Protection on the HP website:

  www.hp.com/servers/proliant/manage

- The Advanced Memory Protection multimedia on the Documentation CD
- The hardware installation and configuration poster that ships with your server
- The hardware installation and configuration labels located on the inside of the access panel of your server
- The installation documentation that ship with option kits
- The Documentation CD, which includes the following resources:
  - The setup and installation guide
  - *Servers Troubleshooting Guide*
  - *HP ROM-Based Setup Utility Users Guide*
  - A link to the maintenance and service guide

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Pbone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telepbone numbers for worldwide Technical Support Centers are listed on the HP website, www.hp.com.

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to `ServerDocumentation@hp.com`.

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Memory

This guide explains the procedures associated with the memory system in your HP ProLiant ML530 Generation 2 server. The topics include:

- Memory quick start guidelines
- Memory board
  - — Parts of the memory board
  - — Memory board LEDs
- Advanced ECC (standard) memory technology
- Advanced Memory Protection options
  - — Online spare memory technology
  - — Single-board mirrored memory technology
- Software
- Memory configuration
- Installation, removal, and replacement procedures

For more information specific to Advanced Memory Protection, refer to the following resources:

- The white paper on Advanced Memory Protection on the HP website:

  www.hp.com/servers/proliant/manage

- The Advanced Memory Protection multimedia on the Documentation CD
- The installation documentation that ships with option kits
- The hardware installation and configuration poster that ships with your server
- The hardware installation and configuration labels located on the inside of the access panel of your server

For more information on configuring the memory through the ROM-Based Setup Utility (RBSU), refer to the *HP ROM-Based Setup Utility Users Guide* on the Documentation CD.

The following warnings apply to all procedures:

WARNING: The server is very heavy, up to 66 kg (146 lb). To reduce the risk of personal injury or damage to the equipment:

- **Remove all hot-plug power supplies to reduce the weight of the server before lifting it.**
- **Observe local occupational health and safety requirements and guidelines for material handling.**
- **Get help to lift and maneuver the server.**
- **Be sure the server casters are locked in place on tower models.**

WARNING: To reduce the risk of personal injury or damage to the equipment:

- **Heed all warnings and cautions throughout the installation instructions.**
- **Allow internal system components to cool before touching any surfaces.**
- **Be sure that the power to the server is turned off and that all power cords are disconnected.**
- **Allow only qualified service personnel—those trained to work with products capable of producing hazardous energy levels—to install options, except when installing hot-plug power supplies or hard drives.**

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedures.

The following warnings apply to in-rack operations only:

WARNING: Always begin by mounting the heaviest item on the bottom of the rack. Continue to populate the rack from the bottom to the top.

WARNING: To reduce the risk of personal injury or equipment damage, always be sure that the rack is adequately stabilized before extending a component outside the rack. A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

WARNING: To reduce the risk of personal injury or equipment damage, be sure that:

- **The leveling jacks are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizers are attached to the rack for single-rack installation.**
- **The racks are coupled in multiple-rack installations.**

WARNING: To reduce the risk of personal injury from hazardous energy or of damage to the equipment when working on energized servers with precautions:

- **Remove all watches, rings, and any other loose fitting jewelry.**
- **Avoid the use of conductive tools inside the server that could bridge live parts.**

CAUTION: For Compaq branded Series 7000 racks, you must install highly ventilated rack door inserts to provide proper front-to-back airflow and cooling.

CAUTION: Be sure that your rack meets all recommended space and airflow requirements for your server.

Memory Quick Start Guidelines

This section gives a brief overview of memory in the HP ProLiant ML530 Generation 2 servers, including:

- Quick start DIMM installation
- Quick start memory configuration
- Quick start LED information

More information about each of these items can be found in this chapter.

Quick Start DIMM Installation

Use the following table as a quick reference for DIMM installation guidelines specific to your desired memory configuration.

Table 1-1: Quick Start DIMM Installation Guidelines

Advanced ECC (Standard) Memory	Online Spare Memory	Single-Board Mirrored Memory
Use only industry-standard PC1600 registered DDR SDRAM DIMMs.	Use only industry-standard PC1600 registered DDR SDRAM DIMMs.	Use only industry-standard PC1600 registered DDR SDRAM DIMMs.
Install DIMMs in pairs.	Install DIMMs in pairs.	Install DIMMs in pairs.
Be sure that both DIMMs in a bank are of the same capacity.	Be sure that both DIMMs in a bank are of the same capacity.	Be sure that both DIMMs in a bank are of the same capacity.
Be sure that bank A is populated.	Be sure that bank A is populated.	Be sure that bank A is populated.
	DIMMs in the online spare bank must be of equal or greater capacity than DIMMs in each remaining bank.	DIMMs in the mirrored banks must be configured identically to the banks they are mirroring.

continued

Table 1-1: Quick Start DIMM Installation Guidelines *continued*

Advanced ECC (Standard) Memory	Online Spare Memory	Single-Board Mirrored Memory
	Bank D must always be populated.	Banks A and C must always be populated.
	Bank D is the online spare bank.	Bank C mirrors bank A. Bank D mirrors bank B.

Quick Start Memory Configuration

If you plan to use online spare memory or single-board mirrored memory, you must configure your desired memory mode through RBSU. HP also recommends testing new DIMMs. To test DIMMs and configure memory:

1. Power on the server.
2. Press the **F9** key to enter RBSU.
3. Select **Advanced Options**.
4. Change **POST Speed Up** to **Disable**.
5. Press any key to return to the RBSU main menu.
6. Select **System Options**.
7. Select **Advanced Memory Protection**.
8. Select the desired memory mode.
9. Press the **ESC** key twice to go back to the RBSU main menu.
10. Press the **F10** key to exit RBSU. The server reboots and tests all memory in the system.
11. Once the memory has been tested, re-enable **POST Speed Up** for faster system boot, if desired.

IMPORTANT: To reconfigure the memory mode after initial setup, you must reboot the system and enter RBSU.

Quick Start LED Information

Table 1-2: Memory LED States on a Properly Configured Memory Board

LED	Memory Configuration		
	Advanced ECC (Standard) Memory	Online Spare Memory	Single-Board Mirrored Memory
Memory status	Green	Green	Green
DIMM 1-8, if populated	Green	Green	Green
"Online Spare" text	Off	Green	Off
Online spare status	Off	Green	Off
Mirroring status	Off	Off	Green

Note: When the server is configured for online spare mode, bank D is the online spare bank.

Memory Board

This section provides the following information about the memory board:

- Parts of the memory board
- Memory board LEDs

Parts of the Memory Board

Figure 1-1 and Table 1-3 identify the parts of the memory board.

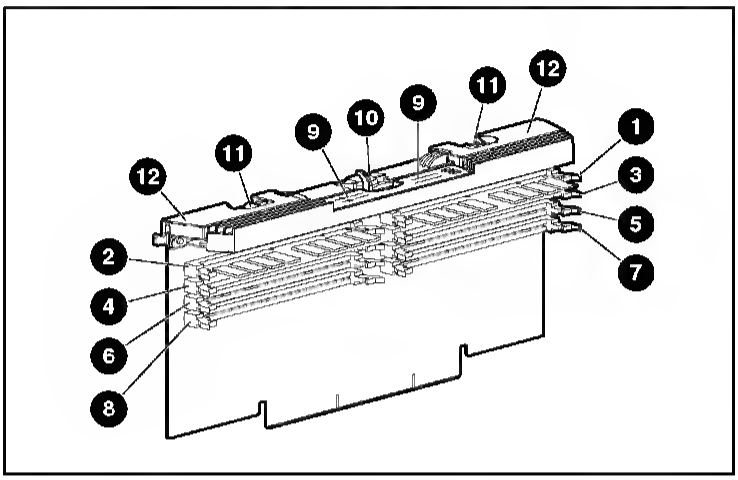

Figure 1-1: Parts of the memory board

Table 1-3: Parts of the Memory Board

Item	Description
1	DIMM slot 1, bank A (must be populated)
2	DIMM slot 2, bank A (must be populated)
3	DIMM slot 3, bank B
4	DIMM slot 4, bank B
5	DIMM slot 5, bank C
6	DIMM slot 6, bank C
7	DIMM slot 7, bank D*
8	DIMM slot 8, bank D*
9	LEDs
10	Locking switch

continued

Table 1-3: Parts of the Memory Board *continued*

Item	Description
11	Release latches
12	Ejector levers

*When the system is configured for online spare memory, bank D is the online spare bank.

Memory Board LEDs and Icons

Use the following figure and tables to identify LEDs and icons on the memory board.

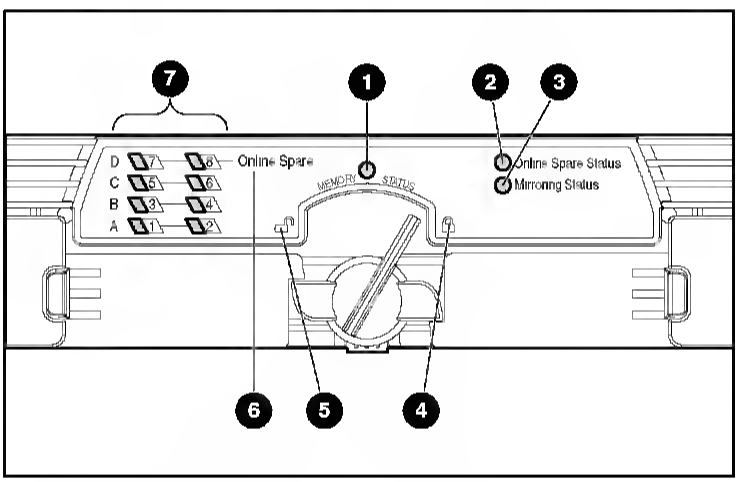

Figure 1-2: Memory board LEDs and icons

Table 1-4: Advanced ECC (Standard) Memory LEDs

Item	Description	Indicator	Status
1	Memory status	Off	Memory board is offline.
		Green	Memory board is online.
		Flashing green	Memory board is busy.
		Amber	Memory error has occurred.

continued

Table 1-4: Advanced ECC (Standard) Memory LEDs *continued*

Item	Description	Indicator	Status
7	DIMM 1-8 status	Off	DIMM is not installed.
		Green	DIMM is installed.
		Amber	Memory error has occurred on this DIMM.
		Flashing amber	Configuration error has occurred.
1-3, 6, 7	All LEDs	Flashing amber	CAUTION – Memory board is in use; relock it immediately.

Table 1-5: Online Spare Memory LEDs

Item	Description	Indicator	Status
1	Memory status	Off	Memory board is offline.
		Green	Memory board is online.
		Flashing green	Memory board is busy.
		Amber	Memory error has occurred.
2	Online spare status	Off	Memory board is not configured for online spare memory.
		Green	Online spare memory is functioning properly.
		Amber	Memory error has occurred and system has failed over to the online spare bank.
6	"Online Spare" text	Off	Bank is not configured as an online spare bank.
		Green	Bank is configured as an online spare bank.
		Flashing green	Failure has occurred and online spare bank is active.
7	DIMM 1-8 status	Off	DIMM is not installed.
		Green	DIMM is installed.
		Amber	Memory error has occurred on this DIMM.
		Flashing amber	Configuration error has occurred.
1-3, 6, 7	All LEDs	Flashing amber	CAUTION – Memory board is in use; relock it immediately.

Table 1-6: Single-Board Mirrored Memory LEDs

Item	Description	Indicator	Status
1	Memory status	Off	Memory board is offline.
		Green	Memory board is online.
		Flashing green	Memory board is busy.
		Amber	Memory error has occurred.
3	Mirroring status	Off	Memory board is not configured for single-board mirrored memory.
		Green	Single-board mirrored memory is functioning properly.
		Amber	Memory error has occurred and system has failed over to the mirrored bank(s).
7	DIMM 1-8 status	Off	DIMM is not installed.
		Green	DIMM is installed.
		Amber	Memory error has occurred on this DIMM.
		Flashing amber	Configuration error has occurred.
1-3, 6, 7	All LEDs	Flashing amber	CAUTION – Memory board is in use; relock it immediately.

Table 1-7: Memory Board Icons

Item	Description	Status
4	Lock	Memory board is locked and cannot be removed.
5	Unlock	Memory board is unlocked; do not remove unless the server is powered down.

Note: The icon at which the memory board switch is pointed indicates whether the memory board is locked or unlocked.

Advanced ECC (Standard) Memory Technology

This section details the features and DIMM installation requirements for advanced ECC memory.

Features

Advanced ECC memory has the following advantages:

- The server can support up to 16 GB of system memory using 2-GB DIMMs.
- Advanced ECC memory detects both single-bit and multi-bit errors, and corrects single-bit errors. It can also detect and correct 4-bit errors that occur within a single DRAM chip on a DIMM.

DIMM Installation Requirements

Observe the following DIMM configuration requirements when installing DIMMs:

- Use only industry-standard PC1600 registered DDR SDRAM DIMMs in 256-MB, 512-MB, 1-GB, and 2-GB capacities.
- Install DIMMs in pairs, one bank at a time.
- Be sure that both DIMMs in a bank are the same capacity.
- Be sure that bank A is populated.

IMPORTANT: HP recommends that you use only HP DIMMs. Third-party DIMMs may have additional installation requirements. For information about third-party DIMM installation requirements, refer to the Advanced Memory Protection white paper on the HP website:

www.hp.com/servers/proliant/manage

IMPORTANT: You must power down the server before installing additional DIMMs.

IMPORTANT: Follow all DIMM configuration requirements carefully. If the DIMMs are not configured properly, you receive an error message during POST.

Advanced Memory Protection Options

The ProLiant ML530 Generation 2 server supports two types of optional Advanced Memory Protection:

- Online spare memory
- Single-board mirrored memory

Each type includes Advanced ECC protection.

Online Spare Memory Technology

This section details the features and DIMM installation requirements for online spare memory.

Features

Online spare memory uses an online spare bank to provide additional memory protection. Online spare memory has the following advantages:

- Online spare memory provides DIMM failover capabilities for single-bit correctable errors. Bank D is configured as an online spare bank. If a DIMM exceeds the HP predefined limit for single-bit correctable errors, indicating that it may fail, the system fails over to the online spare bank.
- The server can support up to 12 GB of system memory and 4 GB of online spare memory using 2-GB DIMMs.

IMPORTANT: DIMMs in the online spare bank must be of equal or greater capacity than the DIMMs in the remaining banks.

Bank D is the online spare bank. The online spare bank can provide memory protection for up to three other banks. If any DIMM in these three banks exceeds the HP predefined limit for single-bit correctable errors, indicating that it may fail, the system performs the following actions:

1. Copies the contents of the degraded bank to the online spare bank
2. Deactivates the failing bank

3. Activates the online spare bank
4. Provides notification of the DIMM failure via the memory board LEDs, the front panel internal health LED, and Insight Manager 7

This process occurs without intervention or server interruption and enables you to replace the degraded DIMM at your convenience during a regularly scheduled shutdown.

DIMM Installation Requirements

In addition to the DIMM configuration requirements for advanced ECC memory, observe the following DIMM configuration requirements when installing DIMMs for online spare memory:

- Bank D is the online spare bank and must be populated when the server is configured for online spare memory.
- DIMMs installed in the online spare bank must be of equal or greater capacity than each of those in the remaining banks.

IMPORTANT: If any one of the above requirements is not met, the system automatically switches to advanced ECC memory and displays an error message during POST.

Single-Board Mirrored Memory Technology

This section details the features and DIMM installation requirements for single-board mirrored memory.

Features

Single-board mirrored memory uses mirrored banks to provide a high level of memory redundancy. Single-board mirrored memory has the following advantages:

- Single-board mirrored memory provides protection against multi-bit errors. If a DIMM on the memory board has a multi-bit error, the system reads from the mirrored banks instead.
- The server can support up to 8 GB of system memory and 8 GB of redundant memory using 2-GB DIMMs.

IMPORTANT: DIMMs in the redundant banks must be configured identically to the banks they are mirroring.

IMPORTANT: If a DIMM exceeds the HP predefined limit for single-bit correctable errors, the system does not fail over to the redundant banks, but does notify you of the condition through Insight Manager 7, the memory board LEDs, and the front panel internal health LED.

In a server configured for single-board mirrored memory, bank C mirrors bank A, and, if populated, bank D mirrors bank B. If any DIMM in bank A or bank B has a multi-bit error, the system performs the following actions:

1. Rereads the correct data from the redundant memory banks
2. Performs all future reads from the redundant memory banks
3. Provides notification of the DIMM failure via the memory board LEDs, the front panel internal health LED, and Insight Manager 7

This process occurs without intervention or server interruption, and enables you to replace the degraded DIMM at your convenience during a regularly scheduled shutdown. Multi-bit errors are detected at the bank level rather than the DIMM level, so if a multi-bit error occurs, both DIMMs in the bank must be replaced.

As long as no errors have occurred on the memory board, the system periodically switches which set of banks it reads from to be sure that both sets are monitored for memory errors.

DIMM Installation Requirements

In addition to the DIMM configuration requirements for advanced ECC memory, observe the following DIMM configuration requirements when installing DIMMs for single-board mirrored memory:

- Bank C mirrors bank A, and bank D mirrors bank B. Banks A and C must always be populated.
- DIMMs in the mirrored banks must be configured identically to the banks they are mirroring. Corresponding banks (for instance, bank A and bank C) must be populated with DIMMs of the same capacity.

IMPORTANT: If any one of the above requirements is not met, the system automatically switches to advanced ECC memory and displays an error message during POST.

Software

The following software components of the memory system provide memory configuration and management capabilities:

- ROM-Based Setup Utility (RBSU)
- Insight Manager 7

IMPORTANT: The optional online spare memory and single-board mirrored memory features do not require special software drivers and are operating system independent.

Memory Configuration

Configuring your server's memory system requires configuring both hardware and software. To configure your memory:

1. Remove the memory board. See "Removing a Memory Board" in this chapter.
2. Install the required DIMMs based on your desired memory mode. Be sure to follow all DIMM installation requirements. See the "DIMM Installation Requirement" section in this chapter for each mode.
3. Install the memory board. See "Installing a Memory Board" in this chapter.
4. Test the DIMMs and configure the memory mode through RBSU:
   a. Power on the server.
   b. Press the **F9** key to enter RBSU.
   c. Select **Advanced Options.**
   d. Change **POST Speed Up** to **Disable.**
   e. Press any key to return to the RBSU main menu.
   f. Select **System Options.**
   g. Select **Advanced Memory Protection.**
   h. Select the desired memory mode.
   i. Press the **ESC** key twice to go back to the RBSU main menu.
   j. Press the **F10** key to exit RBSU. The server reboots and tests all memory in the system.
   k. Once the memory has been tested, re-enable **POST Speed Up** for faster system boot, if desired.

IMPORTANT: To reconfigure the memory mode after initial setup, you must reboot the system and enter RBSU.

Installation, Removal, and Replacement Procedures

This section describes memory installation, removal, and replacement procedures.

Removing a Memory Board

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure.

To remove a memory board:

1. Power down tbe server. Refer to "Powering Down the Server" in Chapter 3, "Installing Hardware Options," in the setup and installation guide on the Documentation CD.
2. Open the hot-plug door. Refer to "Opening the Hot-Plug Door" in Chapter 3, "Installing Hardware Options," in the setup and installation guide on the Documentation CD.

3. Disengage the locking switch (1).
4. Press the release latches inward firmly, disengaging the board from the server (2). Do not squeeze the latches.
5. Lift the ejector levers up (3).
6. Pull the memory board up out of the server (4).

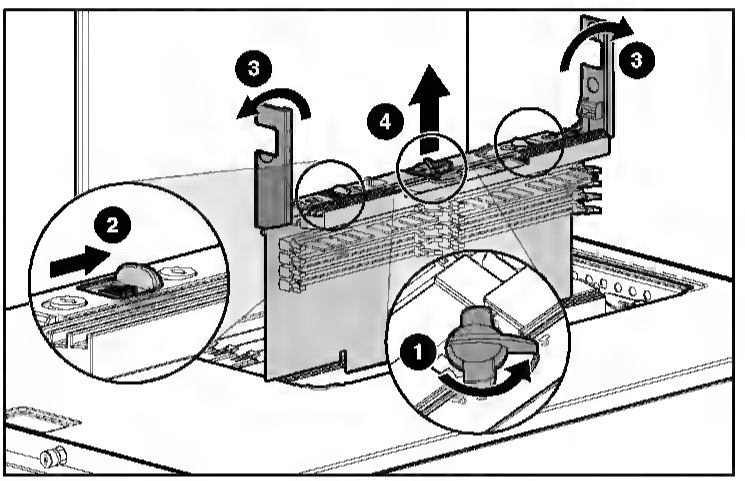

Figure 1-3: Removing the memory board

Removing a DIMM

To remove a DIMM:

1. Remove the memory board. See "Removing a Memory Board" in this chapter.
2. Place the memory board on a level surface.
3. Open the DIMM slot latches (1) to eject the DIMM from the DIMM slot (2).

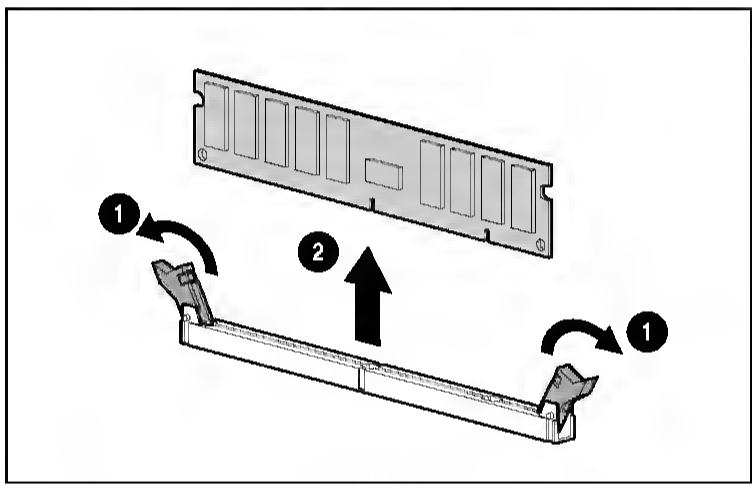

Figure 1-4: Removing a DIMM

Installing a DIMM

To install a DIMM:

1. Remove the memory board. See "Removing a Memory Board" in this chapter.
2. Observe all DIMM installation requirements for your desired memory mode. See the "DIMM Installation Requirement" section in this chapter for each mode.

   IMPORTANT: Follow all DIMM configuration requirements carefully. If the DIMMs are not configured properly, you receive an error message during POST and the DIMM LEDs blink amber.

3. Align the keyed portion of the bottom edge of the DIMM with the tab in the DIMM slot.
4. Press the DIMM firmly into the slot (1) and push the latches into place (2).

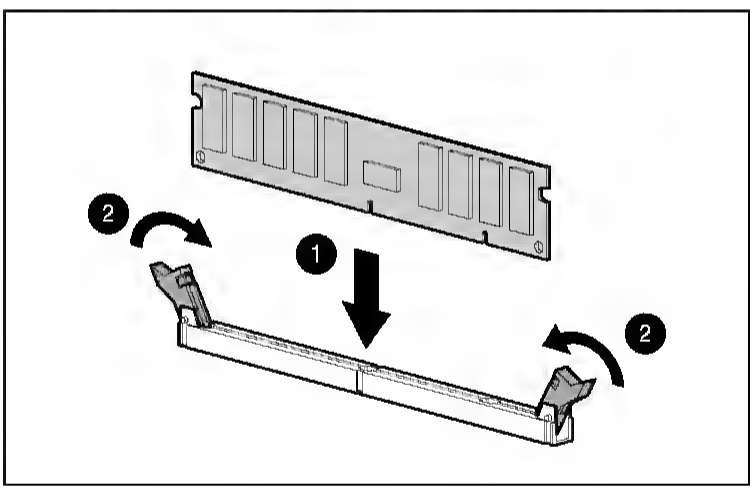

Figure 1-5: Installing and latching a DIMM

IMPORTANT: The bottom edge of the DIMM is designed so that it fits into the DIMM slot only one way.

Installing a Memory Board

To install a memory board:

1. Align the memory board with the memory slot and memory board guide clips.
2. Slide the memory board into the server (1) and close the ejector levers to seat the memory board firmly (2).
3. Engage the locking switch (3).

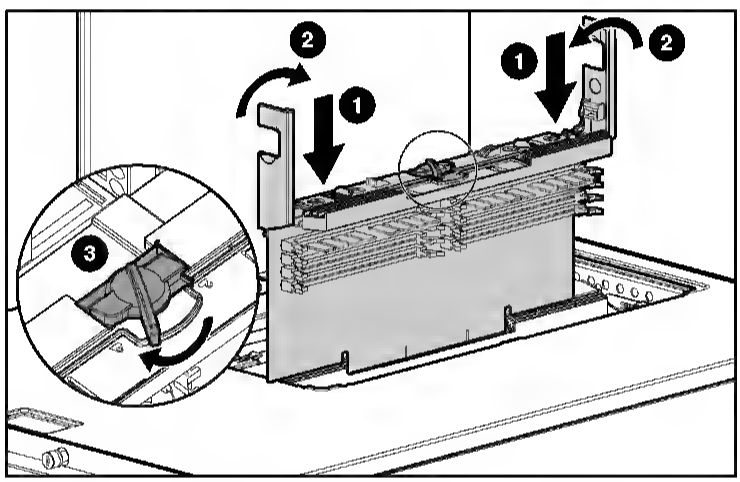

Figure 1-6: Installing a memory board

4. Power up the server. Refer to Chapter 5, "Installing the Rack Server" or Chapter 6, "Installing the Tower Server," in the setup and installation guide on the Documentation CD.
5. Configure the memory. See "Configuring the Memory" in this chapter.
6. Look at the LEDs on the top of the memory board to be sure that the memory is functioning properly. Table 1-8 describes what the LEDs look like for each memory configuration when the DIMMs and memory board are installed and functioning properly. For more information on LEDs, see "Memory Board LEDs" in this chapter.

Table 1-8: Memory LED States on a Properly Configured Memory Board

LED	Memory Configuration		
	Advanced ECC (Standard) Memory	**Online Spare Memory**	**Single-Board Mirrored Memory**
Memory status	Green	Green	Green
DIMM 1-8, if populated	Green	Green	Green
"Online Spare" text	Off	Green	Off
Online spare status	Off	Green	Off
Mirroring status	Off	Off	Green

Note: When the server is configured for online spare mode, bank D is the online spare bank.

7. If any of the LEDs is illuminated solid amber, indicating a failed DIMM, or blinking amber, indicating improper DIMM configuration, refer to the troubleshooting guide on the Documentation CD for instructions.
8. Close the hot-plug door.

2

Error Messages

Use error messages to assist you in troubleshooting and performing basic diagnostic functions in your ProLiant ML530 Generation 2 server. The following tables contain new and unique error messages.

NOTE: Error messages are subject to change.

For a complete listing of the most recent error messages and other troubleshooting information, refer to the *Servers Troubleshooting Guide* provided on your Documentation CD or online at the HP website:

www.hp.com/servers/proliant/manage

For more information about the DIMM installation guidelines discussed in this appendix, see Chapter 1, "Memory."

Table 2-1: POST Error Messages

Error Code	Audible Beeps	Probable Source of Problem	Action
207 - Invalid Memory Configuration - DIMM X unsupported. Only Registered DDR DIMMs are Supported.	1 long, 1 short	Unregistered DIMMs	Install registered PC 1600 ECC DDR SDRAM DIMMs.
207 - Invalid Memory Configuration - DIMM X unsupported. Insufficient Timings on DIMM.	1 long, 1 short	Insufficient DIMM timings	Install registered PC 1600 ECC DDR SDRAM DIMMs.
207 - Invalid Memory Configuration - Mismatched DIMMs within DIMM Bank. Memory in Bank X Not Utilized.	1 long, 1 short	DIMMs within a bank are mismatched or missing.	Install correctly matched DIMMs.
209 - Online Spare Memory Configuration - Bank D is invalid.	1 long, 1 short	Online spare bank is configured incorrectly.	Be sure that DIMMs in the online spare bank are populated correctly.
209 - Online Spare Memory Configuration - No valid banks for online spare.	1 long, 1 short	Only the online spare bank is populated.	Install DIMMs in at least bank A.
209 - Mirror Memory Configuration - Single-Board Mirror DIMMs do not match.	1 long, 1 short	Mirrored banks are not populated identically.	Be sure mirrored banks are populated identically.

Table 2-2: Other POST Messages

POST Message	Description
Advanced Memory Protection Mode: Advanced ECC Support	Advises that the server is configured for advanced ECC memory*
Advanced Memory Protection Mode: Online Spare with Advanced ECC	Advises that the server is configured for online spare memory*
Advanced Memory Protection Mode: Single-Board Mirrored Memory with Advanced ECC	Advises that the server is configured for mirrored memory*
XX MB System memory and XX MB memory reserved for Online Spare.	Advises how much memory is dedicated to system memory and online spare memory
XX MB System memory and XX MB memory reserved for Single-Board Mirroring	Advises how much memory is dedicated to system memory and single-board mirrored memory
*If the memory board or DIMMs are configured incorrectly for the selected memory mode, the system defaults to advanced ECC memory.	

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